# HP 3000 SERIES II COMPUTER SYSTEM
# MANUAL OF STAND-ALONE DIAGNOSTICS

# HP 7920A DISC DRIVE VERIFIER
# STAND-ALONE SLEUTH PROGRAM

SLEUTH07


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## NOTICE

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# CONTENTS

# TABLES

## HOW TO USE THIS MANUAL

- If you are familiar with SLEUTH (D411) and SLEUTH07, refer to Section I.
- If you are not familiar with this verification program and the SLEUTH utility, read Sections II and III before referring to Section I.
- This manual references the following manuals:

| | |
|---|---|
| Console Operator's Guide | 30000-90013 |
| System Manager/System Supervisor Reference Manual | 30000-90014 |
| Model 7920A Disc Drive Operating and Service Manual | 07920-90001 |
| Model 13037A/B Disc Controller Installation and Service Manual | 13037-90006 |
| Stand-Alone SLEUTH Diagnostic (D411A) | 03000-90123 |
| SDUPII Utility Program (D417A) | 03000-90125 |

- As you read the instructions in this manual, keep in mind that some of the responses shown in examples are only examples. For instance, DRT and logical device numbers may differ from one customer to the next depending on system configurations. For each system, you must refer to the System Support Log or the I/O device list to learn what your responses should be.

## SPECIAL CONVENTIONS

RETURN key — Because it is standard operating procedure to end each line you type with a carriage return, this manual does not specifically say to press RETURN after each response. Also, in examples throughout this manual, the word return underlined indicates the RETURN key was pressed in response to a prompt.

uppercase — In this manual, all computer output to the console and all operator input from the keyboard appears in uppercase letters. Actually, you can respond in upper or lowercase.

underlining — in examples distinguishes your input from computer output; your input is underlined.

A percent sign (%) preceding a number indicates the number is in octal notation.

control-H — To correct typing errors, press and hold the CNTL key while typing an h for each character you want to erase.

control-X — To cancel an entire line of typing before the final carriage return, press and hold the CNTL key while typing an x.

control-A — This character terminates the 7920A Verifier Program and returns the SLEUTH utility to the input mode. The SLEUTH07 command list remains intact and you receive an input prompt with a statement number ten higher than the last statement number in SLEUTH07. In examples throughout this manual, >670 is shown as the next statement number. Note that changes to SLEUTH07 could cause this number to change; thus >670 is only an example.

# MINI-OPERATING INSTRUCTIONS

SECTION I

This section summarizes the 7920A disc verification and pack formatting program, SLEUTH07. The section should be used for quick reference by persons familiar with this stand-alone SLEUTH program.

## 1-1 RUNNING SLEUTH07 (A SUMMARY)

- If you intend to use the customer's disc packs for running SLEUTH07, check that a SYSDUMP with a 0 dump date was performed.
- Obtain the disc controller DRT number from the System Support Log or from the list of I/O devices that was printed at SYSDUMP.
- Be sure the SLEUTH utility (D411) is present on a cold loadable I/O stand-alone magnetic tape.
- Check that you have a magnetic tape copy of SLEUTH07 for use when you issue the SLEUTH utility BATCH command.
- Shutdown the MPE-II Operating System. (Complete instructions are given in Section V of the Console Operator's Guide.)
- Check these switches:
  Disc drive READ ONLY switch OFF.
  Disc drive FORMAT switch ON if formatting is planned.
  System Control Panel PF/ARS Switch in the ENBL position.
- Cold load and run the SLEUTH utility as follows:
  a. Mount the I/O stand-alone tape reel on a magnetic tape drive. Select unit 0, place the tape at load point, and the unit on-line.
  b. Set %003006 in the Switch Register on the System Control Panel.
  c. Simultaneously press the ENABLE and LOAD buttons.
  d. In the Switch Register, place the location SLEUTH occupies on the I/O stand-alone magnetic tape.
  e. Press RUN.
  f. Press RETURN on the console to start SLEUTH execution.
- Remove the I/O stand-alone tape reel and mount the tape reel which contains SLEUTH07. Place the the tape at load point, and the unit on-line.

- In response to the >10 prompt, use the BATCH command to load the 7920A Verifier Program (SLEUTH07) from the second magnetic tape.
  ```
  >10 BA E
  ```

- After the tape is read, you receive a SLEUTH prompt for input:
  ```
  >670 RUN
  ```

- Enter the DRT number of the disc controller:
  ```
  7920 VERIFIER, ENTER DRT #  4
  ```

- Test the unit select switch:
  ```
  UNIT SELECT SWITCH TEST? (0=N, 1=Y)  1
  ENTER UNIT #, SET SWITCH TO UNIT # ENTERED, PRESS RUN  0
  ```

  The computer halts with %030377 displayed in the CIR. Set the UNIT SELECT Switch on the disc drive to position 0 and then press RUN on the System Control Panel. The test executes.

  ```
  ENTER UNIT #, SET SWITCH TO UNIT # ENTERED, PRESS RUN  1
  ```

  Repeat switch tests until eight numbers have been tested.

- Testing proceeds as follows:
  ```
  ENTER UNIT # TO BE TESTED  0
  FORMAT PACK? (0=N, 1=Y)  1
  VERIFY PACK? (0=N, 1=Y)  1
  VERIFY LONG PASS? (0=N, 1=Y)  0

  BEGIN FORMAT
  END FORMAT
  BEGIN VERIFY
  VERIFY PASS #1
  END VERIFY

  BEGIN MAIN
  END HEAD TEST
  END TRACK SWITCH TEST
  END W/R TEST
  ```

- The SLEUTH utility now prompts for more input: >670
  Halt the computer to end Sleuth execution.

- Repair the disc drive, if necessary.

- RELOAD the MPE Operating System.

## 1-2. ITEMS TO REMEMBER

- You may terminate SLEUTH07 execution with a control-A. Following control-A, you can: (1) type a RUN command to repeat the tests, (2) type any other SLEUTH command, or (3) press halt on the computer.

# GENERAL INFORMATION

SECTION II

## 2-1. INTRODUCING THE 7920A VERIFIER, SLEUTH07

The SLEUTH07 program is used to diagnose HP7920A Disc Drive problems. It executes interactively with a user to:

- test whether the disc drive responds to unit numbers typed on the console.
- format and verify disc packs.
- test whether the drive heads can read and write both with and without track switching.

SLEUTH07 was developed using SLEUTH programming commands (refer to the program listing in Appendix A). SLEUTH (D411) is a stand-alone diagnostic utility used to generate and run test programs that isolate problems in the I/O section of an HP 3000 Computer and its peripheral devices. In the case of SLEUTH07, we have developed a SLEUTH test program for you.

SLEUTH07 is supplied on the HP 3000 Master Installation Tape (MIT) in the field support account. Its fully qualified name is SLEUTH07.HP32230.SUPPORT.

The following steps summarize running SLEUTH07:

a. SLEUTH07 is copied to magnetic tape from the field support account using EDITOR and FCOPY (refer to paragraph B-1).

b. The SLEUTH utility (D411) is copied to an I/O stand-alone magnetic tape using SDUPII (refer to paragraph B-2).

c. The MPE Operating System is shut down (refer to steps 1 and 2 in paragraph 3-2).

d. The SLEUTH utility is cold loaded (refer to steps 3 through 9 in paragraph 3-2).

e. SLEUTH07 is loaded using the SLEUTH BATCH command (refer to steps 10 through 12 in paragraph 3-2).

f. The SLEUTH utility executes to perform the 7920A Verifier tests (steps 14 through 19 in paragraph 3-2).

g. The disc drive is repaired, if necessary. (Repair procedures are beyond the scope of this manual.)

h. The MPE Operating System is reloaded and restarted (refer to paragraph B-4).

## 2-2. Hardware Requirements

You can run this Verification Program on any minimum HP 3000 Series II Computer System so long as it includes an HP 7920A disc drive.

The disc pack mounted on the drive for testing can be a system pack or a scratch pack. Note however, that all data stored on the disc will be destroyed by the Verifier program.

## 2-3. Software Requirements

Before you can load and run SLEUTH07, the MPE-II Operating System must be shut down and the Sleuth utility cold loaded from an I/O stand-alone magnetic tape. (Appendix B, paragraph B-2 reviews SDUPTI, the utility used to produce cold loadable tapes.)

## 2-4. PROGRAM ORGANIZATION

The Sleuth command list (printed in Appendix A) has four principal sections:

- The UNIT SELECT switch tests.
- The disc formatting utility.
- The disc surface verifier.
- The main write/read tests.

## 2-5. Unit Select Switch Test

The test issues eight RECALIBRATE commands to verify that the disc drive can respond to unit numbers 0 through 7. The test prompts you to type a unit number and then set the UNIT SELECT switch on the disc drive to the same number. When you press RUN on the computer, unit selection is verified.

After eight unit numbers have been tested, program execution continues with the disc formatting section. Note that SLEUTH07 does not keep track of which unit numbers you test, only that you enter a unit number, any number, eight times.

## 2-6. Disc Format Utility

This section of SLEUTH07 initializes and verifies the preamble, data field, and postamble in the 48 sectors of each disc track, including spare tracks. Formatting a pack requires approximately 10 minutes.

## 2-7. Disc Pack Verifier

This test writes data on the disc and then reads the same data to check for disc damage. You have two options:

A SHORT PASS to write and read a worst-case data pattern on the entire disc, including spare tracks, in half track increments. This single-pass test runs for approximately seven minutes.

A LONG PASS to write and read the same pattern in the same manner except that two additional passes are made with the data pattern being shifted after each pass. A long pass requires approximately 21 minutes to complete.

## 2-8. Main Write/Read Tests

The write/read tests execute in three stages:

a. The first test verifies that all heads can write and read random portions of the disc.

b. The second test verifies that all heads can write and read with track switching. For example, 10 sectors of data are written to track 0, head 0, sector 45. After three sectors are written, the disc heads must be able to switch to track 0, head 1, sector 0 in order to write the remaining seven sectors of data.

c. The third test writes and reads random portions of the disc with two different data patterns of different lengths.

## 2-9. ERROR MESSAGES

During program execution, you can encounter programming error messages, general diagnostic messages, and test failure messages.

## 2-10. Program Error Messages

These messages result when you respond incorrectly to prompts. The errors causing these messages are analogous to programming syntax errors in other languages. After printing a program error message, SLEUTH prompts again with the same statement number so that you can retype your response. Program error messages and examples illustrating these messages are printed in Section IV of the SLEUTH Diagnostic Manual.

## 2-11. Diagnostic Messages

These messages report conditions that could terminate or otherwise affect SLEUTH execution. The messages are often combined with test failure messages to report device status and other conditions at the time of a failure. Diagnostic messages are listed in Table C-1 in Appendix C.

If you attempt to format a disc pack with the FORMAT switch OFF and/or the READ ONLY switch ON, you will receive a diagnostic message. The same is true if you attempt pack verification or write/read tests with the READ ONLY switch ON.

In either of these situations, the 7920 Verifier prints a message and halts execution with halt number %17 (%030377 in the CIR display). To resume testing, simply change the appropriate switch positions and press RUN on the System Control Panel.

## 2-12. Test Failure Messages

When SLEUTH detects an error during testing, it suppresses command execution and prints a message describing the error. Following the message, SLEUTH resumes execution at the point where it halted.

SLEUTH-generated test failure messages are listed in Table C-2 in Appendix C. Message examples are given in Section IV of the SLEUTH Diagnostic Manual.

## 2-13. STATUS AND CONTROL WORDS

When SLEUTH reports a test failure, the message generally includes the current device status, the desired status, and other conditions as they were when the error occurred.

You can interpret these messages using the word format tables in Appendix D.

# OPERATING PROCEDURES

SECTION III

This section gives detailed instructions for loading and running SLEUTH07.

## 3-1 BEFORE YOU BEGIN

- Check these switch positions:

  The disc drive READ ONLY slide switch should be off.


READ ONLY

  The disc drive FORMAT slide switch should be on if you intend to format a disc pack.

FORMAT


  The PF/ARS switch, located behind the System Control Panel face plate, should be set to the ENBL position.

- If you intend to use the customer's disc pack(s) for testing, check that a back-up magnetic tape copy of the entire system has been made. This copy should have been produced using a 0 dump date in the SYSDUMP command. If you must dump the system, refer to Appendix B, paragraph B-3 for mini-instructions.

- The SLEUTH utility (D411) must be loaded onto the downed HP 3000 System before you can load and run SLEUTH07. If the SLEUTH utility is not present on a cold loadable I/O stand-alone tape, use the SDUPIT utility to produce such a tape. SDUPIT instructions are summarized in Appendix B, paragraph B-2.

- After the SLEUTH utility has been loaded, the SLEUTH07 command list must also be loaded from a second magnetic tape. The second tape should be produced using the procedures in paragraph B-1.

- When SLEUTH07 executes, it asks for the Device Reference Table (DRT) number of the disc controller. You can obtain this number from the System Support Log or from the I/O device list which was printed during the SYSDUMP.

## 3-2. LOADING AND RUNNING SLEUTH07

1. Be sure all users have logged off the system.

2. At the system console:

   a. ABORT any sessions still logged-on.
   b. Use the RECALL command to check for outstanding allocation messages.
   c. REPLY to all outstanding messages.
   d. SHUTDOWN the system.

   Detailed instructions for performing steps a through d are given in Section V of the Console Operator's Guide.

3. Mount the I/O stand-alone tape containing the Sleuth utility on the magnetic tape drive. Select unit 0.

4. Press LOAD and then ON LINE.

5. On the System Control Panel, enter %003006 into the Switch Register.

6. Simultaneously, press ENABLE and LOAD. The tape moves as a portion is read.

7. Set the Switch Register to the location SLEUTH occupies on the magnetic tape. For example, if SLEUTH is the first file on the tape, enter %000001; if it is the tenth file, enter %000012.

8. Press RUN. The tape moves forward as additional tape is read and then rewinds to the load point.

9. Press the RETURN key on the system console. SLEUTH begins execution with the message:

```
D1 SLEUTH 3000 (HP D411A.00.0)
 (C) COPYRIGHT HEWLETT-PACKARD COMPANY 1976
>10
```

   The >10 prompt indicates SLEUTH is awaiting input from you.

10. At the magnetic tape drive, remove the I/O stand-alone tape and mount the 7920A Disc Drive Verifier tape.

11. Press LOAD and then ON LINE.

12. At the system console, type:

```
>10 BA E
```

13. After the tape has been read, SLEUTH again prompts for input

    >670

    Note from the statement number in the prompt that the command list was loaded successfully. (Remember that SLEUTH prompts with a statement number ten higher than the last statement in the command list.)

    In response, type RUN.

14. The next prompt asks for the Device Reference Table (DRT) number of the disc controller:

    7920 VERIFIER, ENTER DRT #

    Respond with the DRT number taken from the System Support Log or the list of I/O devices.

15. Now testing begins with the first of a series of prompts:

    UNIT SELECT SWITCH TEST? (0=N, 1=Y)

    If you plan to skip over the first test (described in paragraph 2-5), respond 0 and proceed to step 16.

    If you respond 1 to start this test, the following message is printed:

    ENTER UNIT #, SET SWITCH TO UNIT # ENTERED, PRESS RUN

    a. At the system console, type a unit number (0 through 7) followed by a carriage return. When you press the RETURN key, the computer halts with halt %17 (%030377 in the CIR display).

    b. At the disc drive, set the UNIT SELECT switch to the same number you typed at the console.

    c. Press RUN on the System Control Panel.

    If a test succeeds, the ENTER UNIT # prompt is repeated. If a test fails, you receive an appropriate message and then the prompt is repeated. In either case, once a total of eight unit numbers have been tested, program execution proceeds automatically to the format and verification sections.

16. Next, you are asked for the unit number of the drive you want to test.

    ENTER UNIT # TO BE TESTED

    Note the position of the UNIT SELECT switch on the disc drive that you plan to test. The number you type must be the same as the unit selected.

17. Before disc drive testing begins, you can request disc pack formatting.

```
FORMAT PACK? (0=N, 1=Y)
```

To skip the formatting procedure, respond 0. Otherwise, type a 1. Note that formatting requires approximately ten minutes.

18. Next you can request that the disc surfaces be checked for damage:

```
VERIFY PACK? (0=N, 1=Y)
```

If you want to skip these tests, respond 0. If you respond with a 1, you receive still another prompt:

```
VERIFY, LONG PASS? (0=N, 1=Y)
```

Responding 0 causes SLEUTH07 to perform the short test described in paragraph 2-7. The test runs for about seven minutes.

Responding 1 causes SLEUTH07 to perform the long test. This test runs for about 21 minutes.

19. You have now supplied all of the information SLEUTH07 needs. Execution begins with disc formatting (if formatting was requested), continues with a short or long pass check of the pack surfaces (if checking was requested), and completes with the main Write/Read tests described in paragraph 2-8. The program tells you what is happening with the following messages:

```
BEGIN FORMAT            (if formatting was requested)
END FORMAT

BEGIN VERIFY            (if verifying was requested)
VERIFY PASS #1              (short or long pass)
VERIFY PASS #2              (long pass only)
VERIFY PASS #3              (long pass only)
END VERIFY

BEGIN MAIN
END HEAD TEST
END TRACK SWITCH TEST
END W/R TEST
```

If a failure occurs, an appropriate message is printed and execution continues automatically.

20. Finally, after the END W/R TEST message signals that all tests are complete, the Sleuth utility returns to the input mode and prints:

    >670

    At this time you can type RUN to repeat the entire sequence, type any other SLEUTH command, or halt the computer.

# SLEUTH07 LISTING

APPENDIX A

```
  5 DEV 0,16,15,999,0
 10 DB AA,3072,W
1(%155555),I(%133333),I(%066666)
 15 DB BB,3072,0
 20 DB EE,1024,R
 25 DB FF,1024,0
 30 PUT "7920 VERIFIER,ENTER UNIT#"
 35 GET 0,0
 40 MC 0
 45 TIO 0
 50 GO 30,%100000,7
 55 PUT "UNIT SELECT SWITCH TEST?(0=N,1=Y)"
 60 GET X
 65 IF X=0 THEN 120
 70 FOR A=0 TO 7
 75 PUT "ENTER UNIT#,SET SWITCH TO UNIT# ENTERED,PRESS RUN"
 80 GET 0,U
 85 NOPR
 90 HALT
 95 LOOP 95,200
100 PR
105 RC 0
110 GO 75,%117400,7
115 NEXT A
120 PUT "ENTER UNIT# TO BE TESTED"
125 GET 0,U
130 RC 0
135 GO 120,%117400,7
140 PUT "FORMAT PACK?(0=N,1=Y)"
145 GET X
150 PUT "VERIFY PACK?(0=N,1=Y)"
155 GET Y
160 IF Y=0 THEN 175
165 PUT "VERIFY,LONG PASS?(0=N,1=Y)"
170 GET Z
175 IF X=0 THEN 325
180 PUT "BEGIN FORMAT"
185 RC 0
190 FOR N=0 TO 1
195 IDI 0,AA,3,N
200 GO 210,%100000,7
205 IF X=X THEN 235
210 IF N=I THEN 650
215 PUT "DISC IS READ ONLY OR FORMAT SWITCH OFF"
220 PUT "CORRECT CONDITION,PRESS RUN"
225 HALT
230 NEXT N
235 FOR A=0 TO 822
240 FOR B=0 TO 4
245 SEEK 0,A,B,0
250 IDI 0,AA,3,N
255 ID 0,AA,3,N,A,B,24
260 VER 0,48,A,B,0
265 NEXT B
270 NEXT A
275 PUT "END FORMAT"
280 RC 0
285 FOR N=0 TO I
290 WDI 0,AA,7
295 GO 305,%100000,7
300 IF X=X THEN 325
305 IF N=I THEN 650
310 PUT "DISC IS READ ONLY,CORRECT CONDITION,PRESS RUN"
315 HALT
320 NEXT N
325 IF Y=0 THEN 440
330 PUT "BEGIN VERIFY"
335 FOR N=1 TO 3
340 CHB AA,S
345 FOR A=0 TO 822
350 FOR B=0 TO 4
355 SKWD 0,AA,7,A,B,0
360 RDI 0,BB,7
365 GO 375,%100000,7
370 IF X=X THEN 380
375 CB 0,AA,BB,3
380 SKWD 0,AA,7,A,B,24
385 RDI 0,BB,7
390 GO 400,%100000,7
395 IF X=X THEN 405
400 CB 0,AA,BB,3
405 NEXT B
410 NEXT A
415 PUT "VERIFY,PASS#"
420 LIST N
425 IF Z=0 THEN 435
430 NEXT N
435 PUT "END VERIFY"
440 PUT "BEGIN MAIN"
445 RC 0
450 FOR B=0 TO 4
455 RAND A
460 LET A=A MOD 813
465 SKWD 0,AA,7,A,B,0
470 RDI 0,BB,7
475 CB 0,AA,BB,3
480 NEXT B
485 LOOP 450,40
490 PUT "END HEAD TEST"
495 FOR B=0 TO 4
500 RAND A
505 LET A=A MOD 813
510 SKWD 0,EE,7,A,B,45
515 RDI 0,FF,7
520 CB 0,EE,FF,3
525 NEXT B
530 LOOP 495,40
535 PUT "END TRACK SWITCH TEST"
540 RAND D
545 LET A=D MOD 813
550 LET B=D MOD 5
555 LET C=D MOD 47
560 SKWD 0,AA,7,A,B,C
565 RS 0
570 SKRD 0,BB,7,A,B,C
575 GO 585,%100000,7
580 IF X=X THEN 590
585 CB 0,AA,BB,3
590 RS 0
595 SKWD 0,EE,7,A,B,C
600 RS 0
605 SKRD 0,FF,7,A,B,C
610 GO 620,%100000,7
615 IF X=X THEN 625
620 CB 0,EE,FF,3
625 CHB AA,S
630 CHB EE,R
635 LOOP 540,250
640 PUT "END W/R TEST"
645 IF X=X THEN 665
650 RQST 0
655 DISP 0,R
660 PUT "STATUS ERROR"
665 END
```

# MPE ACTIVITIES

APPENDIX B

This appendix summarizes MPE system backup and restart procedures. Although the customer is normally responsible for dumping and reloading the operating system, we provide abbreviated instructions in case you must assume these responsibilities.

In addition, this appendix includes instructions for producing the magnetic tapes which you must use when loading the SLEUTH utility and SLEUTH07 onto a shutdown 3000 System.

## B-1. COPYING SLEUTH07 TO MAGNETIC TAPE USING FCOPY

SLEUTH07 resides on disc in the field support account. It must be copied to magnetic tape for reloading after the MPE Operating System is shutdown. The tape file which contains SLEUTH07 must have two end-of-file marks. Use the following procedure to produce such a tape.

At a tape drive, mount a fresh tape reel. Place the tape at load point and the device on-line.

At the System Console:

```
control-A
=SESSION
:HELLO FIELD.SUPPORT,HP32230
 SESSION NUMBER = #S532
 THU, DEC  2, 1976,  3:22 PM
 HP32002A.00.04
:FILE T;DEV=TAPE;REC=40,1,F,ASCII
:EDITOR
HP32201A.5.01 EDIT/3000 THU, DEC 2, 1976, 3:23 PM
(C) HEWLETT-PACKARD CO. 1976

/KEEP NULL
/EXIT

 END OF SUBSYSTEM
:RUN FCOPY.PUB.SYS
HP32212A.1.02 FILE COPIER (C) HEWLETT-PACKARD CO.

>FROM=SLEUTH07;TO=*T

?I/015:26/#S532/23/LDEV# FOR "T" ON TAPE (NUM)
control-A
=REPLY 23,7

EOF FOUND IN FROMFILE AFTER RECORD XXX
XXX RECORDS PROCESSED *** 0 ERRORS

>FROM=NULL;TO=*T

?I/015:45/#S532/23/LDEV# FOR "T" ON TAPE (NUM)
control-A
=REPLY 23,7

EOF FOUND IN FROMFILE AFTER RECORD XXX
XXX RECORDS PROCESSED *** 0 ERRPRS

>EXIT
 END OF PROGRAM
:BYE
```

You now have a magnetic tape which can be loaded after you load the SLEUTH utility and issue the BA E command.

## B-2. CREATING A STAND-ALONE TAPE USING SDUPII

Before you can actually run the SLEUTH utility and subsequently load and run SLEUTH07, SLEUTH must be copied from the field support account to an I/O stand-alone diagnostic tape for cold loading on a 3000 Computer. Coldable tapes are produced using the SDUPII utility which also resides in the field support account.

Use the following abbreviated instructions to make a stand-alone copy of SLEUTH. (Programs are called "stand-alone" when they can be loaded and run without the MPE Operating System.)

Mount a fresh tape on the magnetic the tape drive. Press the LOAD and ON LINE buttons.

At a terminal:

```
return
:HELLO FIELD.SUPPORT,HP32230
:RUN SDUPII.PUB.SYS

3000 DIAGNOSTIC UTILITY PROGRAM (SDUPII) D417A.00.00
  (C)COPYRIGHT HEWLETT-PACKARD COMPANY 1976.

DO YOU WANT INSTRUCTIONS?
ANSWER 'YES' OR 'NO'  NO

INPUT DIAGNOSTIC TYPE  2

PROGRAM NAME?  PD411A

PROGRAM NAME?  /

INPUT DRT OF THE LINE PRINTER
A CARRIAGE RETURN ASSUMES NO LINE PRINTER  %10

INPUT LINE PRINTER TYPE
MODELS-2607A, 2613A, 2617A, AND 2618A ARE TYPE 0
MODELS-2610A AND 2614A ARE TYPE 1
A CARRIAGE RETURN ASSUMES TYPE=0
1

MOUNT TAPE ON TAPE UNIT
TAPE REQUEST HAS BEEN ISSUED
OPERATOR MUST NOW REPLY TO REQUEST
```

At the system console, use the REPLY command to assign the logical device number (ldv = magnetic tape unit# + 7).

```
control-A
=REPLY 23,7
```

The SLEUTH utility is copied to tape and a map is printed. After copying is complete, you receive the END OF PROGRAM message.

## B-3. DUMPING AN MPE OPERATING SYSTEM

For complete instructions on dumping a system, refer to Section VI in the System Manager/System Supervisor Manual and to Section V in the Console Operator's Manual. A summary follows.

Mount a fresh tape on a magnetic tape drive. Place the tape at load point and the unit on-line.

At a terminal:

```
return
:HELLO MANAGER.SYS
 SESSION NUMBER = S142
 THU, OCT 7, 1976,  3:05 PM
 HP32002.00.03

:FILE TAPE;DEV=TAPE
:FILE LP;DEV=LP
:SYSDUMP *TAPE,*LP
 ANY CHANGES? YES
 SYSTEM ID = HP32002A.00.03
 MEMORY SIZE = 128?  return
 I/O CONFIGURATION CHANGES? YES
 LIST I/O DEVICES? YES
```

This list is important because you need to know the DRT number of the 7920A Disc Drive. If you already know the DRT number, respond NO to the ANY CHANGES? prompt and you will immediately receive the ENTER DUMP DATE? prompt.

Once the list of I/O devices has been printed, you can respond to subsequent prompts with a carriage return until the dump date prompt.

```
 ENTER DUMP DATE? 0
 LIST FILES DUMPED? NO
```

At the system console, use the REPLY command to assign the logical device number of the magnetic tape drive (ldn = unit# + 7).

```
control-A
=REPLY 23,7
```

Once this is done, the entire system is copied to tape(s).

After dumping is complete, you receive the message:

```
END OF SUBSYSTEM
```

Now you can shutdown the system.

## B-4. RELOADING THE MPE OPFERATING SYSTEM

Use the following instructions for doing a simple reload from backup magnetic tapes. Refer to Sections IV and V of the Console Operator's Guide for additional information about the options available when restarting the MPE Operating System.

a. Mount the first SYSDUMP tape reel on the magnetic tape drive. Select unit 0. Press LOAD and ON LINE.

b. At the System Control Panel, place %003006 in the Switch Register.

c. Simultaneously, press the ENABLE and LOAD switches. A portion of the tape is read. When tape movement stops, the RUN light should turn off (the SYSTEM HALT light should also be off).

d. Press RUN. The RUN light should turn on.

e. At the console, press the RETURN key. If nothing happens, reset the terminal and press RETURN again.

f. Answer the prompts as follows:

```
WHICH OPTION <COLDSTART/RELOAD/UPDATE>? RELOAD
WHICH OPTION <SPREAD/COMPACT/RESTORE/ACCOUNTS/NULL>? return
LOAD MAP?  return
ANY CHANGES?  return
```

If you used a scratch pack for testing, prompts concerning the disc volume label are omitted and loading begins immediately.

If you did not use a scratch disc pack for the 7920A Verifier tests, the next prompts will ask questions about the Volume Table. This happens because the table is destroyed during testing. The questions are part of the Initiator-User Dialogue which is discussed in Section V of the System Manager/ System Supervisor Manual. After you supply information for the disc label, loading begins.

Once loading is complete (this could take up to four hours if a multi-reel SYSDUMP was done), prompting continues:

```
DATE?
2/18/76

TIME?
16:35

WED, FEB 18,1976,  4:35 PM?  return

*WELCOME*
```

# ERROR MESSAGES

APPENDIX C

You may encounter the messages listed in the following tables:

- Table C-1. Diagnostic Messages
- Table C-2. Test Failure Messages

In addition to the messages listed in tables C-1 and C-2, you may receive SLEUTH-generated programming error messages. These are listed in the SLEUTH Diagnostic Manual.

Table C-1. Diagnostic Messages

| MESSAGE NUMBER | DIAGNOSTIC MESSAGE | COMMENTS |
|---|---|---|
| D1 | SLEUTH 3000 (HP D411A.00.0) | Standard SLEUTH message. |
| D2 | PASS COUNTER EQUALS xxxxxx | Within the program loop, a BUMP P (bump pass counter) command incremented the counter and displayed this message. |
| D3 | LAST TIO STATUS IS<br>x xxx xxx xxx xxx xxx | The test I/O (TIO) command obtained the status of a logical device. That status was returned by a STAT T command. |
| D4 | LAST CCG STATUS IS<br>x xxx xxx xxx xxx xxx | This message reports the status of Condition Code G. Refer to the System Reference Manual for information about CCG. |
| D5 | LAST SIO PROGRAM EXECUTED IS<br>xxxxxx: xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx | The message includes the address of the most recently executed SIO program and the words in the program. A D5 message is always combined with a D6 message. |

Table C-1. Diagnostic Messages (Continued)

| MESSAGE NUMBER | DIAGNOSTIC MESSAGE | COMMENTS |
|---|---|---|
| D6 | SIO PROGRAM POINTER EQUALS xxxxxx | Following a data transfer error, xxxxxx indicates the last word transferred in the SIO sequence. (Refer to the D5 message.) |
| D7 | NO CURRENT SIO PROGRAM | A DUMP command requested an SIO program dump but the last SIO program is not available. |
| D8 | **POWER FAIL** | Self explanatory. |
| D9 | LAST SYNDROME IS | This message results from a DISP Y command. |
| D10 | REQUESTED STATUS IS<br>X xxx xxx xxx xxx xxx<br>X xxx xxx xxx xxx xxx | A display command (DISP R) returns two words of status: word 1 and word 2. Refer to Appendix D for word formats. |
| D11 | SECTOR ADDRESS IS xxxxxx | A Request Sector Address (RSA) command created this message. |
| D12 | ALLOCATION STATUS | This message resulted from a DISP U command. |

Table C-2. Test Failure Messages

| MESSAGE NUMBER | DIAGNOSTIC MESSAGE | COMMENTS |
|---|---|---|
| E1 | xxxx FAILED IN STEP XXX, CONDITION CODE=xxx | During SLEUTH execution, the CPU issued an SIO program command but the disc drive failed to respond.<br><br>CCG = Device Not Busy<br><br>CCE = Responding Device Controller<br><br>CCL = Non-responding Device Controller |
| E2 | xxxx FAILED IN STEP xxx | The disc drive failed to respond to the xxxx command in step xxx. |
| E3 | STATUS IS x xxx xxx xxx xxx xxx | |
| E4 | STATUS SHOULD BE x xxx xxx xxx xxx xxx | The device status returned as the result of a command did not correspond to the status expected by SLEUTH. |
| E5 | CYLINDER=xxx, SECTOR=xx HEAD=xx | A data transfer failed. The message indicates the disc area or the head that caused the problem. |
| E6 | DATA WORD xxxx IS x xxx xxx xxx xxx xxx | |
| E7 | SHOULD BE x xxx xxx xxx xxx xxx | An error occurred during a data transfer. The data word xxxx is currently the number in message E6. SLEUTH expected the number in E7. |
| E9 | MISSING INTERRUPT IN STEP xxx | The CPU issued the command in step xxx but the controller failed to respond. |

Table C-2. Test Failure Messages (Continued)

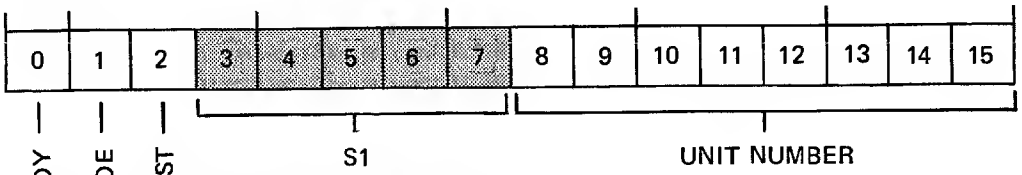
| MESSAGE NUMBER | DIAGNOSTIC MESSAGE | COMMENTS |
|---|---|---|
| E10 | UNEXPECTED INTERRUPT FROM DEVICE xxx in STEP xxx | While SLEUTH was testing one device, it received an interrupt from another device (xxx). The message includes the DRT number of the second device. |
| E11 | ADDRESS READ IS xxxxxx, xxxxxx | The combined commands, Request Disc Address (RDA) and Display Disc Address (DISP) obtained the last address from the 7920A disc controller. The first number is the logical cylinder address and the second is the head and sector logical address. |
| E12 | CHANNEL IS xx, SHOULD BE xx | |
| E13 | ERROR COUNT ON LOGICAL UNIT x EXPIRED | The logical unit x has incurred more errors than the Device command (DEV) allotted. |
| E14 | BUFFER IS NOT CORRECTABLE | A status two type error has occurred with a non-correctable data error. |
| E15 | RIO STATUS IS x xxx xxx xxx xxx xxx | SLEUTH issued a read I/O which failed. The RIO status is returned by an automatic TIO command. |

# STATUS AND CONTROL WORDS

APPENDIX D

Table D-1. Status Word Returned by TIO, SENSE, and END Commands

STATUS WORD (TIO, SENSE, END)




| S1 | TERMINATION STATUS | OCTAL CODE* |
|---|---|---|
| 0 000 0 | = Normal completion | 000 |
| 0 000 1 | = Illegal opcode | 004 |
| 0 011 1 | = Cylinder compare error | 034 |
| 0 100 0 | = Uncorrectable data error | 040 |
| 0 100 1 | = Head-sector compare error | 044 |
| 0 101 0 | = I/O program error | 050 |
| 0 110 0 | = End of cylinder | 060 |
| 0 111 0 | = Overrun | 070 |
| 0 111 1 | = Possibly correctable data error | 074 |
| 1 000 0 | = Illegal access to spare track | 100 |
| 1 000 1 | = Defective track | 104 |
| 1 100 0 | = Access not ready during data operation | 110 |
| 1 001 1 | = Status word 2 | 114 |
| 1 110 0 | = Attempt to write on protected or defective track | 130 |
| 1 011 1 | = Unit unavailable | 134 |
| 1 111 1 | = Drive attention (seek complete) | 174 |

| OCTAL CODE* | TERMINATION STATUS | COMMENTS/ACTION |
|---|---|---|
| 000 | Normal Completion | A command executed without error. |
| 004 | Illegal Opcode | A command was not a disc controller command. Refer to the instruction set in the 13137A/B Disc Controller Installation and Service Manual for valid commands. |
| 034 | Cylinder Compare Error | The address of the sector being read from or written to does not compare as expected with the address of the prior sector. |
| 040 | Uncorrectable Data Error | During a read operation, a parity error was detected. Error correction circuits could not recover. |

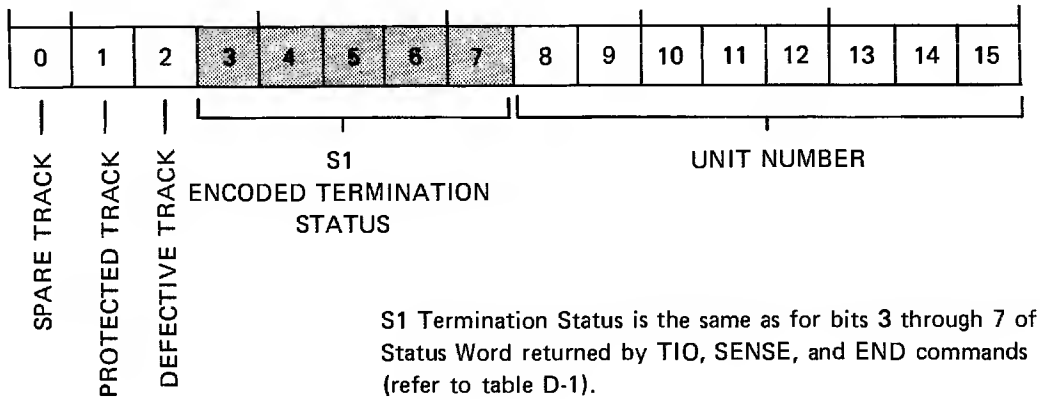
* The Octal Code is the octal representation of bits 1 through 9 assuming bits 1, 2, 8, and 9 are clear (set to zeros).

Table D-1. Status Word Returned by TIO, SFNSE, and END Commands (Continued)

| OCTAL CODE* | TERMINATION STATUS | COMMENTS/ACTION |
|---|---|---|
| 044 | Head-Sector Compare Error | Similar to Cylinder Compare Error (Code 034). Head and/or sector address field of disc sector does not compare with the corresponding field in the controller's Head-Sector Address Register. |
| 050 | I/O Program Error | The CPU detected an abnormal channel operation and notified the controller. The controller then interrupted the CPU with the status. (Example: A read command was transmitted to the controller but the channel is programmed to write.) |
| 060 | End of Cylinder | A data transfer required going beyond the end of the current logical cylinder but the instruction file mask does not allow the controller to automatically seek to the next cylinder. |
| 070 | Overrun | The instantaneous data transfer rate of the controller exceeds that of the CPU-IOP combination. The condition was detected by the CPU-IOP (read) and/or the controller (write). |
| 074 | Possibly Correctable Data Error | A data error was detected and corrected by the error correction circuits. |
| 100 | Illegal Access to Spare Track | An error resulted from attempting to seek to a spared track. |
| 104 | Defective Tract | During pack verification, the test detected that the D-bit is currently set (indicating the track is defective). |
| 110 | Access Not Ready During Data Operation | During a data transfer, the heads moved off track. |
| 114 | Status Word Two | The disc drive was unable to complete a command issued by the controller. Refer to table D-3. |
| 130 | Attempt to Write on Protected or Defective Track | While verifying a pack, the P-bit was found to be set (protect) during a write operation. |
| 134 | Unit Unavailable | The unit field of the command word is greater than %7. |
| 174 | Drive Attention | The controller generated an interrupt to the CPU because the drive needs attention. For example, a seek completed or a drive fault occurred. |

Table D-2. Status Word One Returned by REQUEST STATUS Command

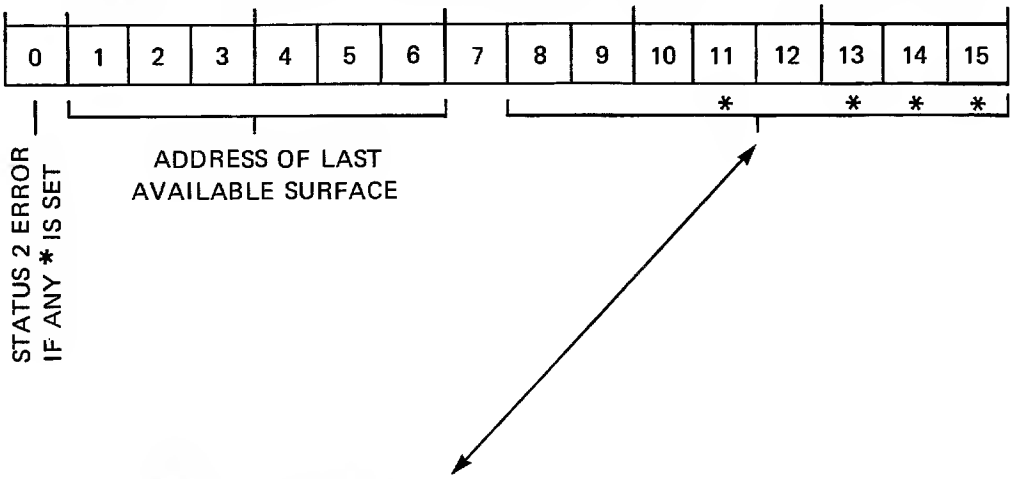
**STATUS WORD ONE (First Status Word Returned by the REQUEST STATUS Command)**




S1 Termination Status is the same as for bits 3 through 7 of the Status Word returned by TIO, SENSE, and END commands (refer to table D-1).

Table D-3. Status Word Two Returned by REQUEST STATUS Command

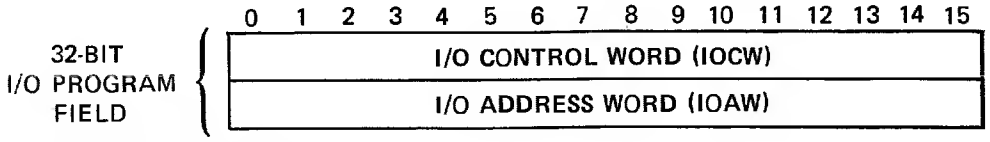
**STATUS WORD TWO (Second Status Word Returned by the REQUEST STATUS Command)**



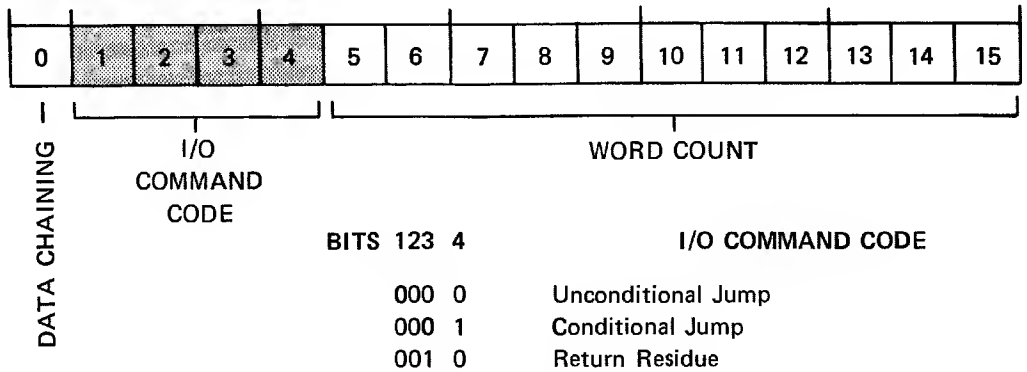

| BIT | MEANING WHEN SET (1) |
|---|---|
| 8 | ATTENTION – The disc drive needs attention. |
| 9 | PROTECTED – The READ ONLY switch is set to protected position. |
| 10 | FORMAT – The FORMAT switch is set to the format position. |
| 11* | FAULT – A read/write or servo fault was detected. (Destructive faults cause the heads to unload.) See the Fault Table (Table D-5). |
| 12 | FIRST STATUS – The head has gone from "not ready" to "ready". |
| 13* | SEEK CHECK – A SEEK was attempted while the drive was still processing the previous SEEK command. |
| 14* | DRIVE NOT READY – Heads are not loaded (over the disc). |
| 15* | DRIVE BUSY – Heads are not positioned and settled over a valid track. |

* Bit 0 will always be set if bit 11, 13, 14, or 15 is set (1).

Table D-4. I/O Program Field



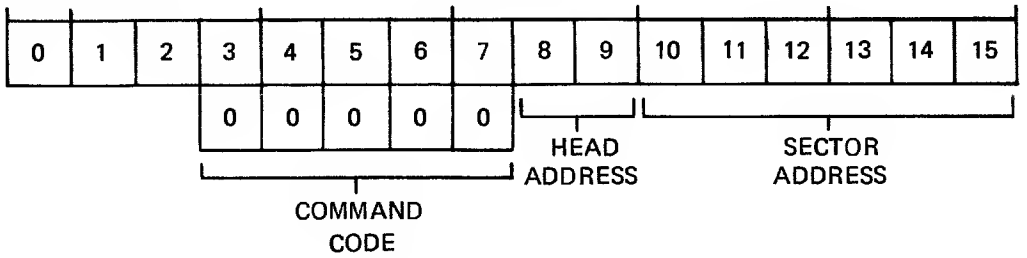

IOCW FORMAT




| BITS 123 | 4 | I/O COMMAND CODE |
|---|---|---|
| 000 | 0 | Unconditional Jump |
| 000 | 1 | Conditional Jump |
| 001 | 0 | Return Residue |
| 001 | 1 | Set Bank |
| 010 | 0 | Interrupt |
| 011 | 0 | End Without Interrupt |
| 011 | 1 | End With Interrupt |
| 100 | 0 | Control |
| 101 | 0 | Sense |
| 110 | - | Write |
| 111 | - | Read |

Note that bit 4 is part of the word count for read and write operations.

IOAW FORMAT – COLD LOAD READ COMMAND




IOAW FORMAT – INITIALIZE DATA COMMAND

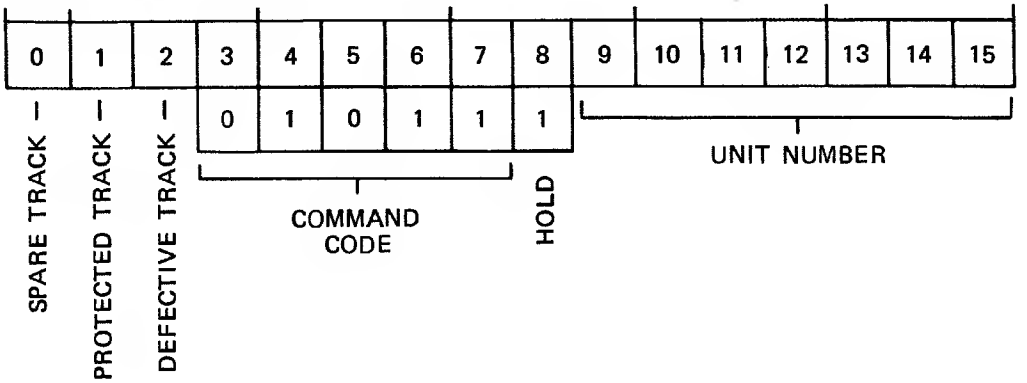
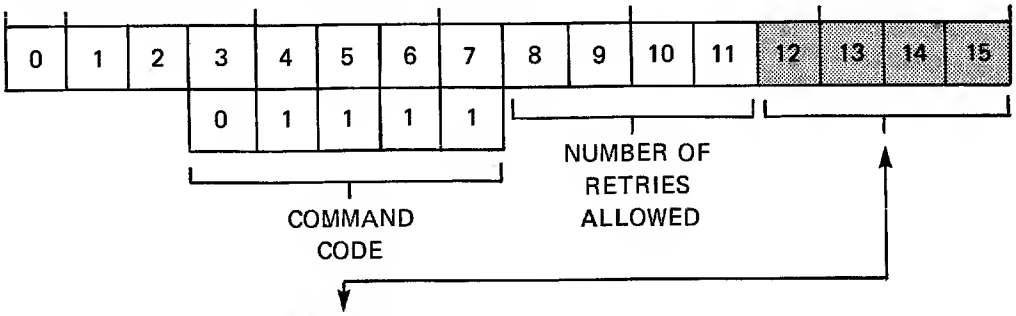


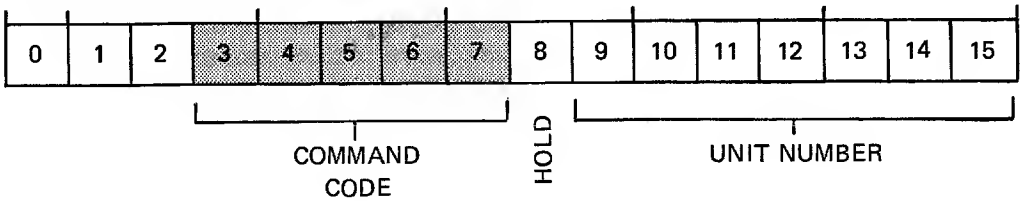
Table D-4. I/O Program Field (Continued)

**IOAW FORMAT – SET FILE MASK COMMAND**




| BIT | | MEANING |
|---|---|---|
| 12 | 0 | Incremental Seek } Bit 12 is Ignored if Bit 15 is clear (0). |
| | 1 | Decremental Seek } |
| 13 | 1 | Automatic Seek to Spare |
| 14 | 0 | Increment or Decrement in Cylinder Mode |
| | 1 | Increment or Decrement in Surface Mode |
| 15 | 0 | Ignore Bit 12 |
| | 1 | Automatic Seek Upon Bit 12 |

**IOAW FORMAT – ALL REMAINING COMMANDS**




| BITS 3 456 7 8 | MEANING |
|---|---|
| 0 000 1 1 | Recalibrate |
| 0 001 0 1 | Seek |
| 0 001 1 0 | Request Status |
| 0 010 0 0 | Request Sector Address |
| 0 010 1 1 | Read Data |
| 0 011 0 1 | Read Full Sector |
| 0 011 1 1 | Verify |
| 0 100 0 1 | Write Data |
| 0 100 1 1 | Write Full Sector |
| 0 101 0 0 | Clear |
| 0 110 0 0 | Address Record |
| 0 110 1 0 | Request Syndrome |
| 0 111 0 1 | Read with Offset |
| 1 001 0 1 | Read without Verify |
| 1 001 1 0 | Load TIO Register |
| 1 010 0 0 | Request Disc Address |
| 1 010 1 0 | End (No-operation) |
| 1 011 0 0 | Wake-up |

## Table D-5. HP 7905/7920 Disc Drive Fault Indicators

The eight LED indicators which are located on the Operator Panel show the occurrence of non-destructive, destructive, servo, and interlock faults.

| LED INDICATOR | FAULT NAME | COMMENTS |
|---|---|---|
| IL | Interlock | DC power failure, voltage out of tolerance, improper PCA seating, to mention only a few. |
| T | Timeout | Maximum time limit exceeded for a SEEK, RECAL, or INITIAL LOAD operation. |
| AGC | Automatic Gain Control | AGC signal lost while heads were over servo surface. |
| CB | Carriage Back | Successful head load but Carriage Back Detector shows heads still back. |
| R-W | Read/Write | Simultaneous read and write operations. |
| MH | Multihead | More than one head active. |
| DC - $\overline{W}$ | DC Write Current • $\overline{\text{Write}}$ | Heads receiving write current but drive not in write mode. |
| W - $\overline{AC}$ | Write • $\overline{\text{AC Current}}$ | Drive in write mode but data not being written on disc. |
| W - $\overline{AR}$ | Write • $\overline{\text{Access Ready}}$ | Heads not positioned over valid cylinder and drive in write mode. |

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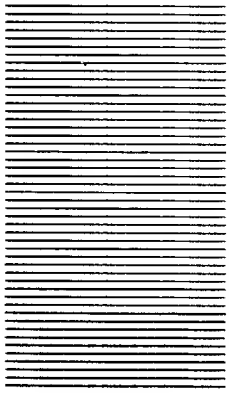

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**SLEUTH07**

**32230-90002** **Oct 1977**

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